

INTERNATIONAL TROPICAL TIMBER ORGANIZATION

ITTO

PROJECT PROPOSAL

TITLE	UTILIZATION, COLLECTION AND TRADE OF TROPICAL NON-WOOD FOREST PRODUCTS IN THE PHILIPPINES
SERIAL NUMBER	PD 15/96 Rev.2 (M,I)
PERMANENT COMMITTEE	FOREST INDUSTRY
SUBMITTED BY	GOVERNMENT OF PHILIPPINES
ORIGINAL LANGUAGE	ENGLISH

SUMMARY

Upland forest dwellers in the Philippines numbering about 17.8 million are primarily dependent on the collection and sale of non-wood forest products (NWFP) for their livelihood. Non-wood products such as rattan, bamboo, vines and erect palm leaves are in demand by the furniture and handicraft manufacturers and exporters. At present, there is no documented information on the actual volume of NWFP available in the forest and on their regeneration pattern and cycle. No data is available on the income of forest dwellers derived from the sale of NWFP. Marketing practices and prices structure of the products is likewise not known. Actual needs and problems of forest dwellers in the collection, processing and storage of NWFP is also undocumented.

The project will undertake a wide range of activities to provide information and possible solutions to the above issues and concerns specifically on the role of NWFP collection and trade in promoting income and livelihood in local forest communities. Finally, it will relate NWFP collection, utilization and trade to sustainable forest management.

EXECUTING AGENCY	FOREST PRODUCTS RESEARCH AND DEVELOPMENT INSTITUTE (FPRDI)
COOPERATING GOVERNMENTS	GOVERNMENT OF PHILIPPINES
DURATION	36 MONTHS
APPROXIMATE STARTING DATE	1997

BUDGET AND PROPOSED SOURCES OF FINANCE	Source	Contribution in US\$	Local Currency Equivalent
	ITTO	345,196	
	Gov't of Philippines	382,800 (+ in kind)	
	TOTAL	727,996	

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PART I. CONTEXT

A. Relevance to ITTO

1. Compliance with ITTA Objectives

The project is consistent with the objectives, established in Article 1 of the ITTA 1983: To encourage the development of national policies aimed at sustainable utilization and conservation of tropical forests and their genetic resources, and at maintaining the ecological balance in the region concerned. It will also have peripheral beneficial effects on the attainment of the other objectives listed in the ITTA, as the project will assist to promote that the collection and utilization of non-wood tropical forest products will be on sustainable basis and an integral part of sustainable forest management.

2. Compliance with ITTA Criteria

The project is submitted in accordance with areas and is consistent with the criteria set forth in Article 23 of ITTA:

- (a) Natural forest development
- (b) It should yield benefits to the tropical timber economy as a whole and be relevant to the producing as well as consuming members;
- (c) It should offer reasonable prospects for positive economic returns in relation to cost.

3. Relation to ITTO Action Plan and Priorities

The project is consistent with ITTO Action Plan and is related to the priorities and programs established.

- Identification of demonstration/pilot areas where sustainable production and utilization of timber and non-timber products may be combined.
- Delivery of trial volumes of new species and products, and other approaches to facilitate acceptance in selected foreign markets.
- Projects in selected strategic areas/locations to promote the integrated development and sustainable forest management and industrial use of forest products.

B. Relevance to National Policies

1. The project has Relevance to National Policies which include:

- (a) Revised Forestry Code of the Philippines - In its provisions, forest occupants who entered into forest land before May 19, 1975 should no longer be prosecuted provided they undertake activities to protect and conserve the forest resources.
- (b) Another government program known as the Forest Occupancy Management Program in which the forest occupants were considered bonafide occupants of the land they live on. Each participant or occupant is issued a renewable two-year forest occupancy permit covering a maximum of seven hectares.
- (c) The Communal Tree Farming Program - This was launched in 1979. Under the program, all forest occupants were allocated an area equivalent to the actual occupancy, for which they were issued a lease agreement for a period of 25 years renewable for another 25 years.
- (d) Integrated Social Forestry Program - The program started in 1982, became the umbrella of all Social Forestry related policies/initiatives of the government merging the objectives, activities of previous undertakings. The program is called the forestry for rural development wherein rural people are perceived as the resources to be utilized as well as the beneficiaries of the program.
- (e) Community-Based Forest Management Leases - The system allows small scale logging operations by forest occupants primarily through community forest leases, whereby labor-intensive harvesting and processing methods (using bolos, axes, carabao, etc.) shall be utilized.

2. Institutional and Legal Framework

The Forest Products Research and Development Institute (FPRDI) will be the implementing agency and will report directly to ITTO. FPRDI shall assign the Project Leader, Assistant Project Leader, Study Leaders and Support Personnel in consultation with ITTO. The implementing agency will provide the salaries, medicare, and insurance of Regular project personnel (technical, administrative and support) amounting to about US\$382,800.00 in cash and in kind as shown in Table 3. The ITTO shall assign a representative during the periodic monitoring and review of the project. It will also provide the necessary budget/funds amounting to US\$345,196.00 to cover the costs for project personnel (incentives for Regular project staff, salaries and insurance of hired contractual personnel), duty travel, consumable items, capital items, miscellaneous, monitoring and evaluation, and ITTO administration cost as presented in Tables 1 and 2.

PART II. THE PROJECT

1. Origin

The Philippines is endowed with forest resources composed of timber and non-timber or non-wood forest products. Although timber has been recognized as a major product from the forest, other products derived from non-wood products are likewise valuable resources. These products include bamboo, rattan, erect palms, vines, medicinal plants, bast fiber plants and other species producing oils.

The cottage industry in the country is primarily dependent on most of the non-wood forest products for making furniture, baskets, fancy boxes, bags, decorative and souvenir items. Millions of revenues (in U.S. Dollars) were derived from the export of the abovementioned products. Besides more employment is being generated both in the local forest communities and in urban areas. Substantial labor force available in upland/forest communities are being utilized for the collection and partial preparation of the non-wood forest products into finished products. Based from Country Papers submitted by some Consumer Member Countries of ITTO during the Eleventh Session of the International Tropical Timber Council (ITTC) in response for the Proposed Progress Toward's ITTO's year 2000 Target in accordance with ITTC Decision 3 (X), some governments categorically stated the need to study the utilization of non-wood forest products and commercially-less accepted species on the basis of sustainable management, and promote market informaion in order to ensure income of the local forest communities in producing member countries.

In the light of these inter-related activities and issues related to non-wood tropical forest products collection, processing and trade, this project is earnestly proposed.

2. Project Objectives

2.1 Development Objective

To provide essential information and technology on the role of non-wood forest products (bamboo, rattan, erect palms, vines, bast fibers, almaciga resins, etc.) utilization, collection and trade in promoting the income and livelihood in local forest communities. Assist to promote that the collection and utilization of non-wood tropical forest products will be on sustainable basis and an integral component of sustainable forest management.

2.2 Specific Objectives

The specific objectives of the project are:

- (i) To determine the approximate volume of non-wood products in the project sites and the number of upland/forest dwellers engaged in collection, processing and sale of the products for their livelihood. Assess the regeneration pattern and cycle of selected non-wood products and recommend sustain-yield collection practices and observation measures for sustainable supply.

(ii) To determine the needs and problems of upland/forest dwellers in collection, processing and storage of non-wood forest products. Recommend and introduce improved methods in the collection, processing and storage. Conduct market research on collection, utilization and trade and provide market information.

3. Project Justification

3.1 Problems to be addressed

About 17.8 million of the country's population live within the forest zone. Majority of this segment of the population belong to the poorest of the poor. Historically, these upland dwellers or forest occupants have contributed significantly to forest degradation, but more importantly, they have the potential and they present a great challenge to be harnessed, motivated, mobilized and sustained to become an effective force in forest rehabilitation and conservation.

During the past decades and up to the present, upland/forest dwellers are primarily dependent on the collection and sale of non-wood forest products for their livelihood. Some of these non-wood products particularly bamboo, rattan, vines, anahaw and pandan leaves are very much in demand by the furniture and handicraft manufacturers and exporters in the Philippines.

At present, there is a lack of documented account or information on the following areas of concern:

(a) Actual volume of non-wood forest products available in second growth forests and the number of forest dwellers/occupants engaged in collection, processing and sale of the products.

(b) Regeneration pattern and cycle of important non-wood products and the localities where supply is available.

(c) Actual needs and problems of the forest dwellers in collection, processing, storage and sale of non-wood products.

(d) Information on marketing strategies/practices and the price structure of non-wood products in forest communities.

(e) The daily or monthly income of forest dwellers engaged in the collection and sale of non-wood forest products.

The project will cover a wide range of activities to provide solutions and information to the above stated issues.

3.2 Characteristics of the region where project will be located.

Project Site 1. San Ildefonso Peninsula, Aurora Province

The project will be located in 3 local communities, (barangays), namely: Bosok-bosok, Dimpalan and Cozo all in San Ildefonso Peninsula. It is part of the forest concession of the Industries Development Corporation (IDC) based in Casiguran, Aurora Province. The land area of the San Ildefonso Peninsula is about 20,000 ha. Most of the soils in the area is suitable for forestry. The area is exposed to the northeastern airflows has an average precipitation of 2,750 millimeters. Typhoon which can form anytime are constant hazards in the area but the most prevalent is in the period from September to December. The peninsula has an annual average temperature of 80°F. During the colder months of November to March, temperature average 78°F. The warmest month is June registering an average temperature reading of 83°F.

San Ildefonso has a quite complex population both in terms of its ethnic composition and its cultural diversity. Most of the settlers are migrates from Bicol, Cagayan Valley, Visayas and few from Tagalog region. Three minorities made up the ethnic groups, viz., the Ilongots, Dumagats and the native Casiguran. In 1994, about, 3,000 inhabitants were living in the three villages, most of which are forest occupants well adapted to their habitat. Others have lived along the banks of the Casiguran Bay.

The mountainous areas of the communities provide the material for the logging industry. More than one-half of the commercial timber and stand are of Dipterocarpaceae species, such as red lauan (*Shorea negrosensis* Foxw.), white lauan (*S. contorta* Vid.) mayapis (*S. palosapis* (Blanco) Merr.) and bagtikan [*Parashorea malaanonan* (Blanco) Merr.]. The species are widely utilized in the manufacture of plywood and veneer and for furniture manufacture by IDC. Lesser-known species (LKS) are occasionally collected and are utilized for core veneers at IDC's plywood processing plant.

About 60% of the inhabitants resorted to collection of non-timber forest products, e.g., rattan, vines erect palms and anahaw leaves. Most of the raw materials collected are transported to the port of Dibacong in Casiguran. Cottage industries in the area include vinecraft, rattanraft, mat and fan making from buri and banca making.

Among the socio-economic-ecological problems indentified were illegal logging, squatting and occupancy, access to forest resources, employment problems and marginal existence of forest product gatherers.

Project Site 2. Paranas, Western Samar Province

The second project site is a part of the forest concession of San Jose Timber Corporation (SJTC), located in Paranas (formerly Wright), Western Samar in the Visayas group of islands belonging to the Philippine geographic division of Region

VIII. It lies between 125° to 12° 10' E longitude and 11°50' to 11°55' N latitude. Estimated to be about 45 km from Catbalogan, it is accessible by land transportation through a gravel road. From Manila, Samar may be reached by plane through its airport in Calbayog City and by commercial ship through Samar's dock in Catbalogan. The proposed project site covers a total of 2,100 hectares of forest lands.

The area generally is mountainous and has a moderate to rugged terrain. Its elevation ranges from 200 m to 300 m above sea level. Falling under the Type II of Coronas climatic classification, the site experiences pronounced maximum rains from November to January without distinct dry months. Lying further in the so-called "typhoon belt" of the Philippines, strong typhoons normally occur in the months of June and November.

Lowland and lower hill dipterocarp forest are the dominant vegetation type in the area while the large timber tree species almaciga (*Agathis philippinensis* Warb.) whose cutting is prohibited by the DENR due to the economic importance of its resin gregariously here and there. Aside from the dipterocarps, several other tree species, palms, climbers and ground herbs composed the diverse vegetation of the proposed project site. As the flora prove diverse, so are the fauna of Samar forest as it harbors prominent wildlife species like Philippine tarsier (*Tarsius*), flying lemur (*Cynocephalus*) and Philippine tree squirrel (*Callosciurus*) to mention a few. Paranas has a total land area of 45,740 ha. and is composed of 46 barangays or communities where farming, fishing and extraction of forest products serve as the major livelihood. The population is about 30,000 people as of 1994. The present condition of the forest of Paranas, however, is influenced by the nearby barangays Casandig I/II, Lawaan I/II, Cantato and Tenani whose residents are engaged directly or indirectly in logging and extraction of various forest products.

Project Site No. 3 Carmen, Surigao del Sur

The third and last project site shall be in barangays Pakwan and Gacub both located within the concession of Surigao Development Corporation (SUDECOR) in Carmen, Surigao del Sur, Mindanao. These are former logging sites of the company which accounted for a small portion of the total areas under licensee of SUDECOR at 75, 120 hectares (45,551 ha. operable forest: and 21, 503 ha inoperable forest). In short, Pakwan and Gacub are logged-over areas that have been converted into re-settlement areas. These are predominantly inhabited by local tribes known as Manobos (90%) while the rest are Cebuanos and Warays. In 1994 about 3,000 inhabitants were living in the Pakwan village, some of which are former workers of the company well adapted to their habitat. Gacub on the other hand has been logged in 1970's, was open for occupancy in 1980's and now with about 2,000 dwellers. Pakwan and Gacub are approximately 20 and 25 kms away from SUDECOR's Wood Office or logging camp and are accessible through an all-weather road. From Manila, the area maybe reached by land, air and water transportation. There are coastal ships that deck in the 8 ports of Surigao del Sur. However, this can be reached by plane in about 1 hour and forty minutes via Cebu City through its airport in Tandag.

The areas are generally rolling and located at the foot of Mt. Diwata, through Pakwan is situated in a relatively more flat area adjacent to the company's plantations of *Albizia falcataria*. Facilities like primary schools, churches of all faiths, health, recreation and day-care centers and barangay hall are readily available in both barangays.

The location of prospective projects sites are swept by northeast winds from November to April. Rainfall, however, is evenly distributed throughout the year and dry season is not well-defined. Average annual rainfall is 4,000 millimeters while average annual temperature is 79°F.

With the vast forest areas around, resident are engaged in fuelwood, poles and piles collection and lumber processing of LUS. Others resorted in the collection of non-timber forest products which include processing of rattan, gathering of various forest products such as anibong palms (bahi), resins from almaciga and *Canarium* spp., abaca stalks, anahaw leaves, vines, pandan, orchids and game animals.

The converted arable and agricultural lands are planted to food crops and commercial crops such as coconut, banana, palay, corn, tobacco, abaca, sugar cane and maguey. However, it was observed that this activity is increasing especially in the adjacent areas as evidence by the number of new areas being burned and opened up.

The Role of Agroforestry in the Project

The International Centre for Research in Agroforestry (ICRAF) has defined agroforestry as a collective name for land-use systems and practices in which woody perennials are deliberately integrated with crops and/or animals on the same land-management unit. The integration can either be in a spatial mixture or in a temporal sequence. There are normally both ecological and economic inter-actions between the woody and non-woody components in agroforestry.

In this regard, the three prospective project sites which had been surveyed have forest settlers that practice agroforestry. Based on initial bio-physical and socio-economic data obtained, the practice of agroforestry in those areas provide some positive impacts on the settlers themselves. Incorporating fast growing species, e.g. *Albizia falcataria*, *Gmelina arborea* or *Acacia mangium*, fruit trees particularly durian and nangka, resin producing species, palms, rattans, bamboos and other non-wood forest products into the local farming system have shown beneficial effects to its people and community, among others:

- 1) improved crop yields without any inputs such as fertilizers;
- 2) prevent soil erosion and improved water retention in the soil;
- 3) provide fodder for animals all year round;

- 4) overcome fuelwood shortage;
- 5) provide construction poles for houses and storage barns as well as fencing materials; and
- 6) In the same manner, the plantation of crops provides a regular monthly income that is augmented and complemented by the seasonal revenues from the fruit-bearing trees; while the rice paddies provides staple food.

Like the natural recovery process of disturbed forest ecosystems, the integration of trees specifically the fast growing one into agricultural systems through agroforestry can be seen as a step toward an ecosystem of increasing ecological integrity. This therefore would help led to the projects' realization of its goals and objectives.

3.3 Other relevant aspects of Pre-Project Situation

The proposed project has no pre-requisite pre-project.

3.4 Intended situation after project completion

The project should provide information on the volume of non-wood forest products and the number of forest dwellers and those engaged in the collection, processing storage and sale of non-wood products in identified project areas. Provide information on the regeneration pattern and cycle of important non-wood products. Generate solutions to the needs and problems encountered by forest dwellers in their daily activities; provide market and other essential information on the role of non-wood products utilization and trade in promoting the income and livelihood in local forest communities. Demonstrate and promote activities that collection, utilization and sale of non-wood forest products can be sustainable basis and an integral component of sustainable forest management.

3.5 Target beneficiaries

The direct beneficiaries of the project will be millions of forest dwellers/occupants who are dependent on the collection and sale of non-wood forest products for their livelihood. Subsequently, the rattan and bamboo furniture and the handicraft (baskets, bags, mats, souvenir items, etc.) producers and exporters in the country who are dependent on non-wood forest products as raw material would be assured of the raw material supply. Ultimately, other members countries of ITTO, having similar problems on their existing forest dwellers/occupants can benefit from the output of the project.

3.6 Project Strategy

3.6.1 Reasons for Selection

Aurora Province in Northern Philippines, Samar Province in Central Philippines and Surigao del Sur in Southern Philippines were selected as the sites of the pilot areas because most non-wood forest products are available in second growth forest in the three provinces. The area of second growth forest in the pilot areas ranged from 30,000 ha to 38,000 ha. It is anticipated that the project would be able to get more relevant data and information from the three selected pilot areas.

3.6.2 Lesson drawn from past evaluation

This is a project proposal aimed to determine the role of non-wood forest products collection, utilization and trade in the income and livelihood of local forest dwellers/occupants in the Philippines. Recommend sustain yield collection practices and observation measures for a sustainable supply of identified non-wood forest products.

In one of the R & D activities of FPRDI-ITTO Project PD 47/88 Rev. 3(I), there were some conflicting opinions and observations made by forest dwellers on the effect of harvesting lesser-used timber species (LUS) on the collection of non-wood forest product on their income. In one forest concession area surveyed, forest occupants revealed that harvesting of LUS reduced their income derived from the collection of non-wood forest products while in other concession areas surveyed, forest occupants revealed that selective cutting of LUS significantly improved the growth of rattan and bamboo thus improving their income from the sale of the non-wood products.

In general, forest dwellers does not observed collection measures and practices to have a sustained yield of important industrial non-wood forest products. They don't have any idea on how to maintain the quality of the products after collection and during storage. Market information on non-wood forest products is alien to forest dwellers. Cost benefit analyses to ensure that their activities are economically viable is not available.

3.6.3 Technical and Scientific Aspects

(a) **Resource Survey and Inventory of Pilot Areas.** Dialogue with Timber License Agreement (TLA) holders as cooperator to provide the pilot area will be undertaken. Dialogue between the staff of the Executing Agency (FPRDI) and the owner or TLA holder on the mechanics of implementation of the project and the importance of promoting the collection and utilization of non-wood forest products on sustainable basis will be done. Project Staff will coordinate closely with the Department of Environment and Natural Resources (DENR) in the implementation of the Project. Local and Barangay officials where pilot areas will be situated shall be contacted and informed of objectives and expected output of the project and its overall impact to the local forest communities.

The criteria for determining possible pilot areas are:

- (i) A pre-survey of the forest concessions where pilot areas are to be situated. The survey shall assess the number of communities and people engaged in the collection and utilization of non-wood forest products.
- (ii) Availability of non-timber forest products in the area, which are collected utilized by forest dwellers as source of living;
- (iii) Existence of market for non-wood forest products in the area and neighboring towns.
- (iv) Willingness of forest dwellers to cooperate in the project.
- (v) Peace and order situation in the area.

Three pilot areas will be selected, one area will be in Western Samar Province in Central Philippines and another site will be in Luzon in Northern Philippines. The third pilot area will be in the province of Surigao del Sur in Southern Philippines. With these 3 pilot areas, the 3 geographical regions of the country are well represented. The pilot area for Luzon will be situated in Aurora Province. The area is under the jurisdiction of Industries Development Corporation (IDC) in which forest occupants are also dependent on non-wood forest products for their living. Inventory of non-wood forest products available will be undertaken. Actual interviews of villagers directly involved with gathering, processing, utilization and marketing of the above stated products will be done. Handling, storage and processing methods employed shall be evaluated. Improved and scientific methods of collection, handling, storage and processing shall be introduced in the rural forest communities. These activities will be undertaken by actual holding of training and demonstration of the appropriate technologies involved in the processing and utilization of major non-wood forest products in forest communities. Training and demonstration shall be conducted on the causes of deterioration in bamboo, rattan, vines, twigs, palmwood and leaves and other related products. Proper handling, drying and storage of the stated products will also be disseminated.

On market research and market information activity, forest dwellers engaged in trade or sale of non-wood forest products will be interviewed to provide some relevant information which would include the following:

- Non-wood products traded by forest dwellers
- Marketing channels and pricing structure
- Seasonability of harvesting non-wood products
- Growth and yield
- Harvesting/procurement system
- Expenses entailed in harvesting
- Sorting/grading practices
- Storage, transport and processing practices

- Marketing cost
- Problems and issues in marketing
- Volume of products traded
- Method of payment
- Market structure, conduct and performance

A structured questionnaire will be used during the survey/interview.

(c) **Assessment of Natural Regeneration :**

In the field, the presence of wildlings or regenerants of important non-wood forest products will be observed. Abundance or rarity will be noted and assessed quantitatively by counting the number of individuals similarly hit or growing at least a meter to the left or right of the strip-line. Fallen fruits/seeds in the area will be observed and the respective places properly marked with stake since fruits or the subject species are large enough to be seen and handled. The length of time for the seed to germinate will be noted through periodic visit and observation. Since for pandan, it is the leaves and stalks that are harvested and have economic value for the gatherer, information on leaf development/regeneration until such time they become harvestable will be obtained through actual field observation and interview of collectors and users in the locality. Added information on the harvestable age and size of those non-wood resources will be taken and evaluated based on observed ecology of the species in nature.

3.6.4 Economic Aspects

Project benefits will be primarily directed to the local forest communities in the two pilot areas where the project will be conducted. Forest dwellers will gain technical knowledge and skills in harvesting/collection and processing non-wood forest products to maintain and likewise improved the quality of their products. With this, they would be able to sale their products at a much higher price to improve their income. With knowledge and skills gain from the Project, the forest dwellers can gain employment in neighboring towns/barangays where processing of non-wood forest products for some handicrafts are being undertaken. These benefits can have a multiplier effect if the technologies and skills gained by the communities in the pilot areas will be adapted by the other local forest communities in the country. The over-all impact of harvesting, utilization and trade of non-wood forest products on the socio-economic conditions of the dependent forest communities is known and available.

3.6.5 Ecological/Environment Aspects

After the project is completed, the much need information on the abundance, distribution, regeneration cycle/pattern, collection, processing, trade and market of non-wood forest products will be available.

The sustain-yield collection practices and observation measures for a sustainable supply of identified non-wood forest products is recommended and the influence of non-wood forest products collection, utilization and trade on sustainable forest management is likewise known and established.

The training that forest dwellers will received from FPRDI will help motivate them to become an effective force in the conservation of important forest resources including non-wood products.

3.6.6 Social Aspects

The technical assistance component of the project covers a wider range of methods/techniques in collecting, processing and proper storage of non-wood forest products for forest dwellers in the pilot areas. Not only those forest dwellers who will be directly trained will benefit but other forest occupants in the rural communities will be exposed in the project. Community members will not only gain better technical skills in collection and processing but they will likewise acquire some know-how on sustain yield collection practices and observation measures for sustainable supply of identified important non-wood forest products. The benefits and other social impact that may be derived by the forest dwellers in the pilot areas as a result of the project will not remain a secret or isolated but will ultimately find avenues where other rural forest communities will try to adopt for the benefit of their members.

3.6.7 Managerial Aspects

The Project Leader and the Assistant Project Leader will managed the implementation of the Project. The Project Leader will manage and administer all activities and set objectives. He shall evolved plans for an effective project implementation and shall coordinate with the Forest Management Bureau, of the Department of Environment and Natural Resources (DENR) and the Cooperating Timber License Agreement holder for the conduct of the project. He shall prepare and submit pertinent reports/documents to ITTO. The Assistant Project Leader shall coordinate the activities and see to it that such activities are implemented based on established time frame and standards. He shall maintain records of data and information gathered by the project. He shall assist the Project Leader in the preparation of the project reports and other relevant documents. The services of one personnel from the DENR with adequate experience in inventory management will be involved in the implementation of the project. FPRDI will assign and nominate the Project Leader, Assistant Project Leader, Study Leaders and support personnel to ITTO. Based from the estimated duration of each activities of the project, the implementation will last for 36 months.

3.7 Reasons for ITTO Support

3.7.1 ITTO Aspects

Considering that the project output will be very relevant and beneficial to other member countries of ITTO, it is requested that appropriate funding be provided through the Special Account of ITTO. The objectives of the project is consistent with ITTO guidelines and objectives.

3.7.2 Relationship to Relevant Actions Supported by Other Donors.

The project as proposed will be implemented by FPRDI with funding from ITTO and the government of the Philippines. There are no other donors funding similar project activities.

3.8 Risks

The risk that is inherent with this type of group participation by forest dwellers in the project is that it is not always easy for forest occupants to adopt improved or scientific methods of processing and storage of important non-wood products. Considering the limited financial resources of forest occupants, there might be some difficulty in providing the necessary inputs to utilize improved processing methods. FPRDI realized this potential risk and intends to overcome it by advising forest occupants to set aside certain amount from the sale of their products for the procurement of some gadgets and chemicals required for improved processing. FPRDI shall likewise develop a follow-up program to implement the continuity of the project after the 3-year duration.

3.9 Overall Capacity of FPRDI to Undertake the Project

The FPRDI since its establishment in 1957 has a specific section or unit which deals on research on tropical non-wood forest products. The staff of the unit is composed primarily of foresters with major in Forest Resources Management and Forest Biological Science and some have advance degrees in Forest Botany, Plant Pathology and other forestry related discipline. Researchers assigned under this unit conduct both basic and applied research in the field and in the laboratory. Some researches that were undertaken along the area of tropical non-wood forest products are:

1. Sustain - yield treatment of bamboo kauayan-tinik (*Bambusa blumeana* Schultes f.). The information obtained on the harvesting method would ensure optimum regeneration and yield of clumps and would be very useful to both large-scale bamboo plantations and backyard planting.

2. Effect of sulfuric acid treatment on resin yield of almaciga (*Agathis philippinensis* warb.). This research activity would improved the crude and injurious method of tapping to attain sustain-yield production of almaciga resin known in trade as Manila copal.
3. The study on the interaction of diameter classes and sulfuric acid treatment on balau yield. This research activity was designed to determine the effects of chemical stimulants on resin yield. Information obtained from the research will serve as a basis for fuller utilization of "balau" producing trees.
4. Survey of minor forest products and other miscellaneous by-products in the Philippines.
5. Study on edible wild food plants and edible wild plants in the Philippines.

At present FPRDI is conducting research activities on the following areas of tropical non-wood forest products documentation and utilization.

1. Identification and end-use characterization of unexploited forest woody vines based on morphological and anatomical features.
2. Evaluation of the morphological features, and oil yield of selected essential oil-bearing plants.
3. Inventory of flora including medicinals in old growth and residual forest in the Philippines.

The FPRDI has eight staff/researchers with Bachelor of Science degree in Forestry with major in Forest Resources Management and Forest Biological Science. Most of the researchers have graduate/advance degrees obtained from abroad and in local Universities and are conducting research activities both in the field and in the laboratory. Field activities are generally related with survey of raw materials available in the forest and also on the assessment of their physical and morphological characteristics. FPRDI has four staff with bachelor and masters degree in Economics. They conduct research activities on economics and market information.

With this situation and existing manpower of FPRDI and with the involvement of an inventory management expert from the DENR, the implementing agency has the capacity to undertake the project.

4. Outputs and Activities

4.1 Specific Objective 1

To conduct a survey of pilot areas and determine the approximate volume of non-wood products and number of upland dwellers engaged in collection, processing and sale of non-wood products. Assess the regeneration pattern and cycle, recommend sustain yield collection and observation measures for sustainable supply.

Output 1

Cooperators and pilot areas identified and the number of forest dwellers and the approximate volume of non-wood products in each pilot area determined. Regeneration pattern and cycle assessed; sustain-yield collection practices recommended to forest dwellers. Number of forest dwellers engaged in collection, utilization and sale of non-wood products determined.

Activity 1.1

Dialogue/discussion with TLA holders/cooperators in selected of pilot areas on the importance, expected output and benefits of the project to the cooperating TLA holders and the forest dwellers/occupants.

Activity 1.2

Determination of actual forest dwellers and those particularly engaged in collection, processing and sale of non-wood products. Assessment of the approximate volume and identification of non-wood products in the areas concerned.

Activity 1.3

Assessment of regeneration cycle and pattern of non-wood forest products.

Activity 1.4

Recommend sustain-yield collection practices and observation measures for the sustainable supply of identified non-wood forest products.

Inputs: Project Staff and Support personnel involved in activities 1.1 to 1.4

4.2 Specific Objective 2

To determine the needs and problems of forest dwellers in collection, processing and storage of non-wood forest products. Recommend and introduce improved methods of collection, processing and storage. Conduct market research on harvesting, utilization and trade of non-wood forest products.

Output 2

Needs and problems of forest dwellers identified. Workable and improved methods of collection, processing and storage of non-wood forest products recommended and introduced. Market research conducted and market information provided to forest dwellers in each project site.

Activity 2.1

Identificaion of the needs and problems of forest dwellers in pilot areas.

Activity 2.2

Packaging, and introduction of improved methods of collection, processing and storage.

Activity 2.3

Conduct market research and disseminate market information.

Activity 2.4

Preparation, evaluation and presentation of the overall impact of processing, utilization and trade of non-wood forest product on the income and livelihood of forest dwellers and dependent communities. Relate sustainable collection and utilization of non-wood forest products to assist sustainable management.

Inputs: Project Staff and Support personnel involved in activities 2.1 to 2.4

5. Logical Framework Matrix

The logical framework matrix is appended.

6. Work Plan

The work plan is appended

7. Institutional Arrangement for Execution and Operation

7.1 Management Structure

FPRDI being the Executing Agency of the project will assign the Project Leader, Assistant Project Leader, Study Leaders, and Support Personnel in consultation with ITTO. The management, implementation, evaluation and reporting of the project will be under the responsibilities of the Project Leader and the Assistant Project Leader. They will be assisted by the Study Leaders who will be the project implementors. Other technical staff of FPRDI will be invited to act as Resource Persons during the transfer/dissemination of technologies to forest dwellers/occupants in the pilot areas.

The Project Leader shall administer and manage the disbursements of funds, supervise the procurement of supplies, materials and equipment. He shall program the activities of the project implementors.

7.2 Key Staff

The key personnel who will implement the project and their respective CV are appended.

8. Prior Obligations and Pre-requisites

At present there are no prior obligations to the start of the project. Once funding is confirmed by ITTO, FPRDI will start activity No. 01 to get the project underway.

9. Possible Future Actions

After the completion of the project, an impact evaluation will be conducted in each project site. This is to determine the actual benefits gained by forest occupants as a result of the project. Funds required for this post activities will be requested from Grants-in-Aid funds of the Philippine Government and ITTO.

PART III. MONITORING, REPORTING AND EVALUATION

1. Arrangement for Reporting

A Bi-Annual progress report on the project activities and output will be prepared and submitted to ITTO every after six months after the project start-up and at such other times as maybe required by ITTO. A project completion report will be prepared and submitted to ITTO as soon as possible after completion and in any case within three months.

2. Arrangement for ITTO Monitoring and Review

The project will be subject to monitoring by representative of ITTO at least once every 12 months.

3. Evaluation

Monitoring missions will be decided whether a mid-term evaluation is necessary. The date of any such evaluation will be agreed between ITTO and Project Management.

PART IV. Budget

The project yearly budget by component requested from ITTO is presented in Table 1 and the overall budget by activity in Table 2. The Government of the Philippines contribution in cash and in kind are presented in Tables 3 and 4.

**Table 1. PROJECT YEARLY BUDGET BY COMPONENT
REQUESTED FROM ITTO**

	Year 1 U.S. \$	Year 2 U.S. \$	Year 3 U.S. \$	TOTAL
10. Project Personnel				
Management/Administration	26,400	26,400	26,400	79,200
Study Leaders	10,800	10,800	10,800	32,400
Research Assistants, Hired	<u>9,000</u>	<u>9,000</u>	<u>9,000</u>	<u>27,000</u>
Sub-Total	46,200	46,200	46,200	138,600
30. Duty Travel				
Daily Subsistence Allowance	12,000	9,000	10,000	31,000
Transport Costs/Vehicles, Airfares	<u>8,000</u>	<u>4,600</u>	<u>6,000</u>	<u>18,600</u>
Sub-Total	20,000	13,600	16,000	49,600
40. Capital Items				
Equipment	13,400	10,000	7,400	30,400
Service Vehicle	<u>36,600</u>	-	-	<u>36,600</u>
Sub-Total	50,000	10,000	7,000	67,000
50. Consumable Items				
Supplies and Materials	11,000	11,000	12,000	34,000
Fuel	<u>1,000</u>	<u>1,000</u>	<u>2,000</u>	<u>4,000</u>
Sub-Total	12,000	12,000	14,000	38,000
60. Miscellaneous				
Sundry	<u>8,000</u>	<u>8,500</u>	<u>8,500</u>	<u>25,000</u>
Sub-Total	8,000	8,500	8,500	25,000
70. ITTO Monitoring, Evaluation				
Monitoring and Evaluation	3,000	3,000	3,000	9,000
ITTO Administration Cost	<u>7,600</u>	<u>4,900</u>	<u>5,496</u>	17,996
Sub-Total	10,600	7,900	8,496	26,996
99. GRAND TOTAL	146,800	98,200	100,196	345,196

Table 2. OVERALL BUDGET BY ACTIVITY REQUESTED FROM ITTO

OUTPUT/ACTIVITIES	BUDGET COMPONENTS (U.S. \$)					ITTO Monitoring Evaluation Administration	GRANI TOTAL
	Project Personnel	Duty Travel	Consumable Items	Capital Items	Miscellaneous		
Output 1 - Cooperators and pilot areas identified. Number of forest occupants and volume of non-wood forest products (NWFP) determined. Regeneration cycle assessed and sustained yield collection practices recommended.	10000		3000	3000	5000	1000	23000
Activities							
1.1 Dialogue with cooperators/TLA holders of pilot areas.	25000		15000	6000	15000	6000	73000
1.2 Determination of number of forest dwellers and volume of NWFP in pilot areas.	20000		12000	7000	7000	4000	54000
1.3 Assessment of regeneration pattern and cycle of NWFP.	10000		6700	4000	5000	3000	30700
1.4 Recommendation of sustained-yield collection practices for sustainable supply.							
Output 1 Sub-Total	65000		36700	20000	32000	14000	180700

Table 2. Cont...

OUTPUT/ACTIVITIES		BUDGET COMPONENTS (U.S. \$)							GRAND TOTAL
		Project Personnel	Duty Travel	Consumable Items	Capital Items	Miscellaneous	ITTO Monitoring Evaluation Administration		
Output 2 - Needs and problems of forest dwellers identified. Workable and improved methods of collection, processing and storage of NWFP recommended. Market research conducted and market information provided to forest dwellers in project site/areas.									
2.1	Identification of needs and problems of forest dwellers	18000	3900	4000	6000	2000	3000		36900
2.2	Packaging, recommendation introduction of workable improved technologies to forest dwellers	25000	6000	9000	20000	5000	5496		70400
2.3	Conduct market research and disseminate market information	10600	2000	2000	6000	2000	3000		25600

Table 2. Cont...

OUTPUT/ACTIVITIES	BUDGET COMPONENTS (U.S. \$)						GRAND TOTAL
	Project Personnel	Duty Travel	Consumable Items	Capital Items	Miscellaneous	ITTO Monitoring Evaluation Administration	
2.4 Preparation, evaluation and presentation of the overall impact of processing, utilization and trade of non-wood forest products on the income and livelihood of forest dwellers and dependent communities. Relate sustainable collection and utilization of non-wood forest products to assist sustainable management.	20000	1000	3000	3000	2000	2500	31500
Output 2 Sub-Total	73600	12900	18000	35000	11000	13996	164496
GRAND TOTAL	138600	49600	38000	67000	25000	26996	345196

Table 3. Government of the Philippines Contribution in Cash

Project Personnel	Year 1 U.S. \$	Year 2 U.S. \$	Year 3 U.S. \$	TOTAL
1. Salaries				
Project Leader (1)	8640	8640	8640	25920
Asst. Project Leader (1)	7680	7680	7680	23040
Study Leaders (4)	19200	19200	19200	57600
Co-Researcher (4)	15360	15360	15360	46080
Administrative Support(4)	15360	15360	15360	46080
Sub-Total	66240	66240	66240	198720
2. Productivity, Insurance and Christmas Bonus for Fourteen Regular Project				
Personnel	5426	5426	5426	16278
3. Payment for Power and Utilities	<u>2000</u>	<u>2000</u>	<u>2000</u>	<u>6000</u>
Sub-Total	7426	7426	7426	22278
TOTAL	73666	73666	73666	220998

Table 4. Government of Philippines Contribution in Kind

	Year 1 U.S. \$	Year 2 U.S. \$	Year 3 U.S. \$	TOTAL
Laboratory Equipment and Facilities				
1. Pathology Section	18268	18267	18267	54802
2. Chemical Treatment Section	17670	17660	17670	53000
3. Drying/Seasoning Section	18000	18000	18000	54000
TOTAL	53938	53937	53937	161802

PROJECT DESIGN SUMMARY

ANNEX 1 LOGICAL FRAMEWORK MATRIX

PROJECT ELEMENTS	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><u>Development Objectives:</u></p> <p>To provide essential information and technologies on the role of non-wood forest products utilization, collection and trade in promoting the income and livelihood in local forest communities. Assist to promote that the collection and utilization of non-wood forest products will be on sustainable basis and an integral component of sustainable forest management.</p>	<p>Generated vital information and technologies on the role of non-wood forest products utilization, collection and trade in promoting income and livelihood in forest communities.</p> <p>Assisted in promoting that collection, utilization and trade of non-wood forest products is sustainable and likewise an integral part of sustainable forest management.</p>	<p>Forest dwellers/occupants became aware that technologies/information on non-wood forest products helps promote income and livelihood in forest communities.</p> <p>Research report prepared.</p> <p>Evaluation of research activities/output.</p>	<p>Effective implementation of Project Staff to disseminate required technologies and information to promote income and livelihood of forest dwellers in local communities. Willingness and cooperation of forest dwellers to adopt and implement methods in collection and processing non-wood forest products in relation to sustainability of non-wood resource.</p>
<p><u>Specific Objectives:</u></p> <p>i) To conduct a survey of pilot areas/sites and determine the approximate volume of non-wood forest products and number of upland/forest dwellers engaged in the collection, processing and sale of non-wood forest products. Assess the regeneration pattern and cycle and recommend sustain-yield collection and observation measures for sustainable supply.</p>	<p>Cooperators/TLA holders in selected pilot areas aware of the importance, expected output and benefits of the project.</p> <p>Volume of non-wood forest products and the number of forest dwellers and those particularly engaged in the collection, processing and trade of non-wood forest products determined.</p>	<p>Total cooperation and participation of TLA holders in the implementation of the project.</p> <p>Reports prepared, submitted and evaluated.</p>	<p>Continued support/cooperation of TLA holders to the project.</p> <p>Cooperation of forest dwellers in the implementation of the project. Continued support of ITTO.</p>

Cont... LOGICAL FRAMEWORK MATRIX

PROJECT ELEMENTS	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>ii) To determine the needs and problems of upland/forest dwellers in collection, processing and storage of non-wood forest products. Recommend and introduce improved methods in collection, processing and storage. Conduct market research on collection, utilization and trade and provide market information.</p>	<p>Determined regeneration pattern and cycle of selected non-wood forest products.</p> <p>Sustained-yield collection practices and observation measures recommended for sustainable supply.</p> <p>Needs and problems of upland forest dwellers identified.</p> <p>Recommended workable and improved methods/solutions to identified needs and problems.</p> <p>Market research conducted and market information provided to forest communities in pilot areas. Overall impact on income and livelihood on dependent communities presented.</p> <p>The effect of non-wood forest products collection, utilization and trade had been related to assist sustainable forest management.</p>	<p>Research reports prepared, submitted and evaluated. Recommendations being adopted by forest occupants/dwellers.</p> <p>Solutions/remedial measures prepared and disseminated to forest dwellers.</p> <p>Reports prepared, submitted and evaluated.</p> <p>Market research reports.</p> <p>Market information disseminated.</p> <p>Impact evaluation of project activities and output.</p> <p>Report of Forest Management Bureau.</p>	<p>Continued cooperation and support of forest dwellers in the implementation of the project.</p> <p>Financial support of ITTO.</p> <p>Project activities conducted as planned. Full cooperation and support of forest dwellers with Project implementors. Support of Forest Management Bureau.</p>

Cont... LOGICAL FRAMEWORK MATRIX

PROJECT ELEMENTS	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Outputs</p> <p>i) Cooperators and pilot areas identified; the number of forest dwellers and approximate volume of non-wood forest products determined.</p> <p>ii) Regeneration pattern and cycle assessed and sustained yield collection practices recommended to forest dwellers in local communities.</p> <p>iii) Needs and problems of forest dwellers identified. Workable and improved methods of collection, processing and storage of non-wood forest products recommended and introduced.</p> <p>iv) Non-wood forest products collected, processed and sold were assessed and determined. Market research conducted and market information provided. An overall impact of harvesting, utilization and trade of non-wood forest products on the income and livelihood of dependent forest communities presented.</p>	<p>Number of forest dwellers and volume of non-wood forest products in pilot areas determined.</p> <p>Regeneration pattern and cycle determined.</p> <p>Sustained-yield collection practices recommended to forest dwellers.</p> <p>Needs and problems identified.</p> <p>Workable and improved methods recommended.</p> <p>Important non-wood forest products collected, utilized and sold determined. Market information provided.</p> <p>The impact of harvesting, utilization and trade of non-wood forest products on the income and livelihood of dependent local forest communities obtained/available.</p>	<p>Impact evaluation of project activities and output.</p> <p>Report of Forest Management Bureau.</p> <p>Research report prepared and submitted.</p> <p>Adoption of recommended practices by forest dwellers.</p> <p>Adoption of recommended improved technologies/methods by forest dwellers.</p> <p>Research reports prepared and presented.</p> <p>Results of impact evaluation of the research activities and output prepared and presented. An increased income of forest dwellers realized.</p>	<p>Project activities conducted as planned. Full cooperation and support of forest dwellers with Project implementors. Support of Forest Management.</p> <p>Continued cooperation and support of TLA holders and forest dwellers to the implementation of the project.</p> <p>- do -</p> <p>- do -</p>

Cont... LOGICAL FRAMEWORK MATRIX

PROJECT ELEMENTS	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>v) The influence of non-wood forest products collection, utilization and trade have been related to assist sustainable forest management.</p>	<p>The collection, utilization and trade of non-wood forest products in local forest communities had been related to assist sustainable forest management.</p>	<p>Final report prepared and presented. Assessment by TLA holders/cooperators of project output. Observations of Forest Management Bureau.</p>	<p>The development and specific objectives of the project were attained based on planned activities and expected output.</p>

TERMS OF REFERENCE
(For Project Leader, Asst. Project Leader and Study Leaders)

I. Project Leader

1. Manages and administers all activities of the project to attain set objectives. Control the disbursements of project funds.
2. Evolves plans and programs for an effective project implementation.
3. Coordinate with the Department of Environment and Natural Resources (DENR) and Timber License Agreement TLA holders for the effective execution of project activities. Present accomplishments during project monitoring, review and evaluation.
4. Prepares, reviews/evaluates and submits project reports to ITTO.

II. Assistant Project Leader

1. Coordinates the implementation of project activities based on planned targets, time frame and standards.
2. Develops/prepares and maintains records of data and information gathered by the project. Review and analyze project results.
3. Assist the Project Leader in the preparation of project reports and other pertinent documents.

III. Study Leaders

1. Conduct/implement the activities in the study based on actual methodology.
2. Gather and generate data and information required by each activity.
3. Prepares and submits monthly, quarterly and semi-annual progress reports to the Assistant Project Leader.

CURRICULUM VITAE

Name : ARNALDO P. MOSTEIRO
Position : Scientist I, Scientific Career System (SCS)
Date of Birth : December 12, 1936
Place of Birth : El Nido, Palawan, Philippines Nationality: Filipino
University/College Graduated: FEATI University, Manila, Philippines
Major Field : Industrial Plant Engineering
University/College Post Graduated: University of the Philippines at Los Baños, M.S. Forestry.
Forest Research Institute, Dehra Dun, India.
Certificate in Seasoning and Preservation of Timber

Relevant Work Undertaken in the Last 3 Years (1993-1995):

Assistant Project Leader, FPRDI-ITTO Project PD47/88 Rev. 3(I) - Research on Utilization of Lesser-used species as Alternative Raw Materials for Forest-Based Industries. Implemented and managed the multi-disciplinary R & D studies of the project specifically the basic and working properties of lesser-used wood species in the Philippines.

Project Leader, FPRDI Project - Establishment of End-Use Properties Requirements and Screening of Wood Species for Selected Wood Products. Established end-use properties criteria for the selection of wood species of various products. Screened and selected wood species for specific end-use.

Project Leader, FPRDI Project - Utilization of Some CLAS and ITPS for Moulding and other Builders Woodworks. Evaluated the characteristics and quality of selected CLAS and ITPS for moulding and other builders woodworks.

Project Leader, FPRDI Project - Production of Millworks and Joinery Using Lesser-used Species. Investigated the suitability of some lesser-used species for millworks and joinery.

Member, National Commodity Team - Philippine Council for Agriculture, Resources Research and Development (PCARRD) for Minor Forest Plants. Participated in all technical meetings of the Commodity Team.

Member, National Team - PCARRD, Philippine Recommends for Wood Furniture. Participated in the preparation of the Philippine Recommends for Wood Furniture.

Member, FPRDI Technical Committees and Task Forces on Research and Development and Science and Technology. Participated in all technical meetings and related activities.

Resource Speaker. In Technology Investment Fora and Technology Fairs in different regions in the Philippines on the subject of Woodcraft and Floor Parquet.

National Representative and Country Paper Presenter, International Workshop on Improved Utilization of Timber Resources in Southeast Asia. Held in Kuala Lumpur, Malaysia.

Member, Philippine Delegation - XV Session of the International Tropical Timber Council held in Yokohama, Japan. Presented the report of accomplishments of FPRDI-ITTO Project PD 47/88 Rev. 3(I). Attended Council and Permanent Committee Sessions.

CURRICULUM VITAE

Name : ARSENIO B. ELLA
Position : Supervising Science Research Specialist
Date of Birth : 17 March 1951
Place of Birth : Daet, Camarines Norte Nationality: Filipino
University/College Graduated: University of the Philippines at Los Baños (UPLB)
Bachelor of Science in Forestry (BSF) 1973.

Major Field : Forest Resources Management (FRM)

University/College Post Graduated: UPLB
Master of Science in Forestry (MSF):1983

Major Field : Wood Science; Wood Anatomy

Relevant Work Undertaken During the Last Three Years (1993-1995): (Brief Description)

- 1) Prepared R&D proposals in the field of wood anatomy, wood quality and non-timber forest products.
- 2) Supervised and conducted independent researches and studies along said field, e.g. 1) identification and end-use characterization of woody vines based on morphological and anatomical features; 2) assessment and germplasm collection of dye-producing plants in the country: tapping of pagsahingin (Canarium asperum Benth); and preparation of a handbook of Philippine trees.
- 3) Conducted technical trainings and seminar-workshop as subject matter specialist (SMS) in wood identification and tapping of almaciga resins;
- 4) Prepared research and other technical reports for publication. For the period, 6 technical reports/articles were published in different scientific and forestry journals, viz.:
 - a) Senior author - Techniques in tapping almaciga (Agathis philippinensis Warb.) for sustained productivity of the tree: The Philippine experience. FPRDI Journal, Vol. 21, Nov. 1-2, July-December 1992: 73-79.
 - b) Sole author - (Sterculia oblongata R. Br.): the country's bast fibers. The S & T Post. Vol. XII, No. 2 March, 1993:8/
 - c) Sole author - Regional assessment and Collection of Available Dye Yielding Plants in the Philippines. The Philippine Technology Journal, Vol. XX, No. 2 April-June 1995: 39-58.
 - d) Senior author - Comparative Wood Anatomy of Philippine Dipterocarpuis spp. (Apitong Group). FPRDI Journal Vol. 21. Nov. 3 and 4 January-June 1993.
 - e) Senior Author - Taxonomy and Wood Anatomy of the Manggasinoro Species. Philippine Journal of Science, Vol. 122, No. 3, July-September 1993: 205-232.
 - f) Sole-author - Bark Anatomy of Six Philippine Dipterocarps. The Philippine Journal of Science. Vol. 122, No. 3, July-September 1993: 301-322.

CURRICULUM VITAE

Name : EUSTAQUIO G. ARAGONES, JR.

Position : Sr. Science Research Specialist

Date of Birth : December 7, 1953

Place of Birth : Los Baños, Laguna

Nationality: Filipino

University/College Graduated: University of the Philippines at Los Baños (UPLB)
College of Forestry.

Major Field : Forest Resources Management (FRM)

University/College Post Graduated: University of the Philippines (UPLB)
M.S. Forestry; Ph.D. Forest Botany

Relevant Work Undertaken in the Last 3 Years: (Brief Description)

Worked on various R & D projects in the field of forest botany and non-timber forest products both as research leader and co-leader.

Led to completion in 1994 an externally-funded (DOST-GIA) FPRDI R&D project that dealt on resource inventory of resin-producing timber trees of the genera Canarium (Burseraceae) and Agathis (Araucariaceae).

Another DOST-GIA funded project on ethnobotany of indigenous Philippine forest plants is expected to be completed in 1996. The researcher serves as member of PCARRD Coordination Team which oversees implementation of the project's various research activities and accomplishment.

Co-Leader of DOST-GIA assisted project on resource inventory and regional assessment of Philippine dye-producing plants which was completed in the first quarter of 1995.

Junior and senior author, respectively, for two botanical identification manuals produced by the FPRDI, viz., "Manual of Philippine Dipterocarps" and "Handbook of Philippine Conifers and Taxad."

CURRICULUM VITAE

Name : MAGDALENA Y. GIRON
Position : Supervising Science Research Specialist
Date of Birth : May 4, 1944
Place of Birth : Tinajeros, Malabon, Metro Manila
Nationality: Filipino

University/College Graduated: UP College of Agriculture

Major Field : Plant Pathology/Microbiology

University/College Post Graduated: Oregon State University

Major Field: Forest Products Pathology

Relevant Work Undertaken During the Last Three Years (1993-1995):
(Brief Description)

- o Biological studies on the deterioration of yakal railway sleepers. 1975. Terminal Report. Deterioration of yakal railway sleepers was determined by microscopic and isolation techniques. Non-decay and decay fungi were isolated from the sleepers. It appeared that deterioration started from the sapwood portion and gradually invaded the heartwood of the quite immature wood.
- o Resistance of spotted gum (*Eucalyptus maculata*) against termites and wood decay fungi. 1995. Terminal Report. Spotted gum was found to be highly resistant to the attack of two white rot fungi, *Fomes lividus* and *Polyporus sanguineus* and two brown rot fungi, *Lenzites* sp. and *L. striata*. The species was resistant to moderately resistant to termite attack.
- o Effectiveness of elemi oil against wood destroying organisms. 1995. Terminal Report. Elemi oil was found to eliminate molds, staining and decay fungi at 2.5 and 5.0% concentrations under laboratory conditions. However, it requires a concentration of 20% to cause an 88% mortality on termites while effect on powder post beetles was minimal.
- o Controlling internal decay of preservative treated standing utility poles. 1993. Terminal Report. The study deals with the nature and extent of internal decay on preservative treated utility poles and methods of controlling or arresting internal decay.
- o Volatile emissions from fumigant treated poles. 1993. Emissions from fumigant treated poles was evaluated by simple closed tube bioassay. Samples were collected from the poles and the vicinities around the treated poles.
- o Fungal deterioration in logs and lumber: Its prevention and effect on physical and mechanical properties. 1994. Terminal Report. Sawn logs and lumber were protected from fungal attack by the application of 2-thiocyanomethylthio-benzothiazole on the logs and lumber after felling and sawing, respectively. Specific gravity, compression parallel to grain and static bending properties were reduced after prolonged exposure in the field.

CURRICULUM VITAE

Name : EMELYNE C. CORTIGUERRA
Position : Science Research Specialist II
Date of Birth : 27 February 1959
Place of Birth : Tayug, Pangasinan Nationality: Filipino
University/College Graduated: Phil. School of Business Administration
Major Field : Economics
University/College Post Graduated: Asian Social Institute
(M.S. in Economics)

Relevant Work Undertaken in the Last 3 Years: (Brief Description)

1. Resource allocation analysis for the establishment of cement-bonded board plants in Region III, Philippines.

This study determined the volume of resources/raw materials that are available for CBB production. It identified the optimal number of plants that can be established in Region III (Central Luzon) based on potential demand resources available.
2. Technology transfer of cement-bonded boards in Region IX, Philippines: Its Financial and Economic Aspects

The technology transfer of Cement-bonded boards is assessed on its financial and economic aspects. The financial aspect dealt on the costs and returns analysis of expanding production of CBB while the economic aspect dealt on the market study of CBB boards in Region IX. Results showed that expanding the CBB technology transfer is viable.
3. Other studies conducted:

Pre-feasibility studies of FPRDI-developed technologies on:
Multiple cap High-pressure sap displacement (HPSD) method of treating bamboo poles
Marketing of pandan cocooning and rotary frames. Demand and potential markets for pandan cocooning and rotary frames were determined. Problems on marketing of the frames were also identified. Marketing strategies were recommended.